



US009638490B1

(12) **United States Patent**
Shen

(10) **Patent No.:** US 9,638,490 B1
(45) **Date of Patent:** May 2, 2017

(54) **PNEUMATIC FIRING DEVICE**(71) Applicant: **Liang-Chi Shen**, Taoyuan (TW)(72) Inventor: **Liang-Chi Shen**, Taoyuan (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/980,528**(22) Filed: **Dec. 28, 2015**(51) **Int. Cl.**

F41B 11/71	(2013.01)
F41B 11/89	(2013.01)
F41B 11/723	(2013.01)
F41B 11/50	(2013.01)
F41B 11/643	(2013.01)

(52) **U.S. Cl.**

CPC	F41B 11/71 (2013.01); F41B 11/50 (2013.01); F41B 11/643 (2013.01); F41B 11/723 (2013.01); F41B 11/89 (2013.01)
-----------	---------------------------------------------------------------------------------------------------------------------------------------------------

(58) **Field of Classification Search**

CPC	F41B 11/72; F41B 11/721; F41B 11/722; F41B 11/723; F41B 11/73; F41B 11/89; F41B 11/71; F41B 11/50; F41B 11/643
-----------	----------------------------------------------------------------------------------------------------------------

USPC	124/71, 73, 74, 77
------------	--------------------

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- | | | |
|-------------------|-----------------------|-------------|
| 5,505,188 A * | 4/1996 Williams | F41B 11/52 |
| | | 124/49 |
| 5,613,483 A * | 3/1997 Lukas | F41B 11/724 |
| | | 124/70 |
| 7,299,796 B2 * | 11/2007 Kirwan | F41B 11/721 |
| | | 124/71 |
| 2003/0168052 A1 * | 9/2003 Masse | F41B 11/57 |
| | | 124/73 |

2007/0028909 A1 *	2/2007 Wood	F41B 11/723
2007/0151548 A1 *	7/2007 Long	F41B 11/721
		124/73
2009/0255523 A1 *	10/2009 Lian	F41B 11/721
		124/73
2009/0301459 A1 *	12/2009 Lian	F41B 11/721
		124/76
2011/0088675 A1 *	4/2011 Wood	F41B 11/721
		124/73
2012/0031386 A1 *	2/2012 Masse	F41B 11/57
		124/73
2012/0090586 A1 *	4/2012 Wood	F41B 11/721
		124/73
2015/0253101 A1 *	9/2015 Scarr	F41B 11/73
		124/73

* cited by examiner

Primary Examiner — Bret Hayes

(74) Attorney, Agent, or Firm — Rosenberg, Klein & Lee

(57) **ABSTRACT**

A pneumatic firing device includes a rear section engaging a cylinder, a solenoid valve engaging the rear section from under, an adjusting element disposed inside the rear section, a piston disposed inside the cylinder to form a first chamber and a second chamber, an airflow guiding element engaging the cylinder at the front thereof, a moving rod having a tail end engaging the piston and a front end stretching through the cylinder into the airflow guiding element for controlling the operation of the airflow guiding element, and a front section engaging the front of the airflow guiding element. The solenoid valve holds control of the operation of a pressure release channel to change the pressure difference between the first and second chamber, making the pressurized air entering a first passage from a first guiding hole of the airflow guiding element, pushing the delivery tube to a firing position, flowing into a second passage from a second guiding hole, and then firing a pellet with strong airflow.

9 Claims, 11 Drawing Sheets

